

CLAIMS

1. A method for improvement of the efficiency of a power amplifier utilized for transmission of radio signals in a portable radio communication device, characterized by the steps of:
 - establishing a required transmission power (4) of said portable radio communication device;
 - determining a desired load impedance that gives an optimal efficiency of said power amplifier (1) for said required transmission power; and
 - controlling (6) the radiating impedance of an antenna element (2) loading said power amplifier in dependence of said desired load impedance.
2. The method as claimed in claim 1, wherein said step of controlling is followed by a step of adaptively controlling said arrangement in dependence of a power output from said power amplifier to increase said power output.
3. The method as claimed in claim 1 or 2, wherein said step of establishing comprises reading out a control signal fed to said power amplifier or reading out the required output power defined by a base station.
4. The method as claimed in any of claims 1-3, wherein said step of establishing comprises measuring an output voltage and an output current from said power amplifier.
- 25 5. The method as claimed in any of claims 1-4, wherein said step of determining a desired load impedance comprises retrieving said desired load impedance corresponding to said required transmission power from a look-up table.

6. A method for improvement of the efficiency of a power amplifier utilized for transmission of radio signals in a portable radio communication device, characterized by the steps of:

- 5 - determining a power output from said power amplifier; and
- controlling (6) the radiating impedance of an antenna element (2) loading said power amplifier adaptively in dependence of said power output from said power amplifier to increase said power output.
- 10 7. The method as claimed in any of claims 1-6, wherein said step of controlling comprises changing a capacitive coupling between said antenna element and a ground element.
- 15 8. The method as claimed in claim 7, wherein said capacitive coupling is changed by varying the capacitance of a varactor.
9. The method as claimed in claim 7, wherein said capacitive coupling is changed by connecting or disconnecting a capacitance.
- 20 10. The method as claimed in any of claims 1-9, wherein said step of controlling comprises changing the size of said antenna element.
- 25 11. The method as claimed in claim 10, wherein said size is changed by connecting a conductive element to said antenna element or disconnecting the conductive element from said antenna element.
12. The method as claimed in any of claims 1-11, wherein said step of controlling comprises adjusting comprises adjusting the length of a slit of said antenna element.

13. The method as claimed in any of claims 1-12, wherein said antenna element is provided on a dielectric body and said step of controlling comprises changing the dielectric factor (ϵ_r) of said dielectric body.

5 14. The method as claimed in claim 13, wherein said dielectric factor is changed by applying a control voltage over said dielectric body.

15. An arrangement for improvement of the efficiency of a power amplifier utilized for transmission of radio signals
10 in a portable radio communication device, characterized by:

- a means for establishing a required transmission power (4) of the portable radio communication device;
- a means for determining a desired load impedance that
15 gives an optimal efficiency of said power amplifier (1) for said required transmission power;
- an antenna element (2) connected to an output of said power amplifier; and
- a control unit (5) for controlling (6) the radiating impedance of the antenna element (2) loading said power amplifier in dependence of said desired load impedance.

16. The arrangement as claimed in claim 15, wherein said means for establishing a required transmission power comprises a read out device for reading out a power control
25 signal fed to said power amplifier or a read out device for reading out the required output power defined by a base station.

17. The arrangement as claimed in claim 15 or 16, wherein said means for establishing a required transmission power

comprises a measure device for measuring an output voltage and an output current from said power amplifier.

18. The arrangement as claimed in any of claims 15-17, wherein said means for determining a desired load impedance 5 comprises a look-up table containing correspondence between desired load impedance and required transmission power.

19. An arrangement for improvement of the efficiency of a power amplifier utilized for transmission of radio signals in a portable radio communication device, 10 characterized by:

- a means for determining a power output from said power amplifier;
- an antenna element (2) connected to an output of said power amplifier; and
- 15 - a control unit (5) for controlling (6) the radiating impedance of the antenna element (2) loading said power amplifier in dependence of said power output from said power amplifier to increase said power output.

20. The arrangement as claimed in any of claims 15-19, 20 wherein said device comprises a capacitive element (8) connected to a ground element, wherein said control unit is arranged to control a coupling of said capacitive element to said antenna element.

21. The arrangement as claimed in claim 20, wherein said 25 capacitive element is a varactor (8).

22. The arrangement as claimed in any of claims 15-21, comprising a conductive element (7), wherein said control unit (5) is arranged to connect said conductive element to

said antenna element (2) or disconnect said conductive element from said antenna element.

23. The arrangement as claimed in any of claims 15-22, wherein said antenna element (2) is provided on a dielectric body and said control unit (5) is arranged to vary the dielectric factor (ϵ_r) of said dielectric body.

24. The arrangement as claimed in any of claims 15-23, comprising a switch (9) arranged to adjust the length of a slit in said antenna element (2).